**Question I**Complete the following sentences:

1. The math block operations are \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_
2. In the math block, A and B values can either be manually set in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or dynamically set with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_ block stores and retrieves values.
4. Variable Data types can be \_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_
5. Variable Action can be either \_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Values are stored in the variable block if the variable block action is set to \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. A programming block, in the data group,can take up to three inputs is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
8. The logicblock operations are \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_
9. The result of the \_\_\_\_\_\_\_\_\_ logic operation will be true only if both input values are true.
10. Xor is an abbreviation for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. The compareblock operations are \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_
12. In the random block, the minimum value for the lower limit is \_\_\_\_\_\_\_\_ while the maximum value for the upper limit is \_\_\_\_\_\_\_\_\_\_\_\_

**Question II**

Mark (T) for true and (F) for false statements.

|  |  |  |
| --- | --- | --- |
| **No.** | **Statement** | **T / F** |
|  | The random block can generate a negative number |  |
|  | In all versions of the NXT software, math block can perform the square root operation. |  |
|  | represents the OR operation |  |
|  | represents the XOR operation |  |
|  | The result of the Or operation will be true if either input value is true or if both input values are true. |  |
|  | Compare block outputs a logic value depending on the result of the comparison |  |

**Question III**

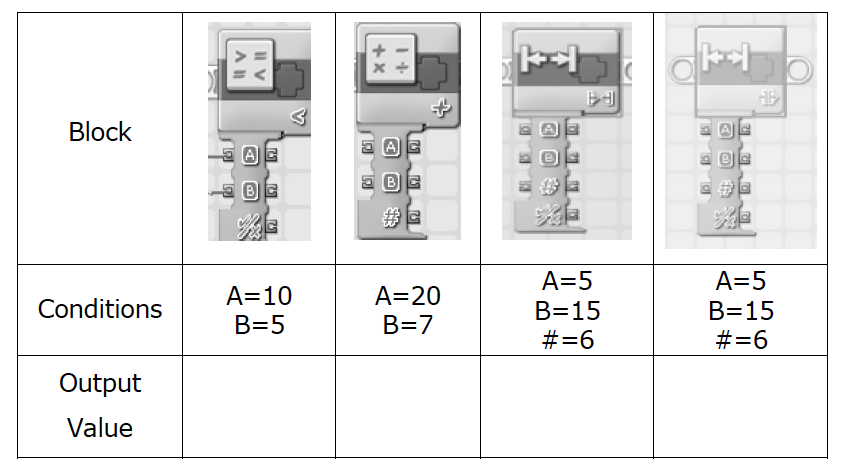
|  |
| --- |
| 1. Identify the programming block that is used to perform the following tasks: |

|  |  |
| --- | --- |
| **Task** | Programming Block |
| Combine multiple conditions |  |
| Calculating the distance your robot has travelled |  |
| Create variables and update them |  |
| Personalize your robot |  |
| Store the total number of red or blue objects produced in a factory |  |
| Improve on traditional color sorting codes by specifying a range values for each color |  |
| Compare the readings from two ultrasonic sensors to drive an explorer robot |  |
| Calculate the area of an object |  |
| Create robotic games |  |
| A robot arm should pick either candy or ice cream but not both. |  |
| Create a robot that exhibits unpredictable behavior |  |

Compare between Logic, Math, Compare and Range blocks. Fill the required information in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Logic** | **Math** | **Compare** | **Range** |
| Block Operations |  |  |  |  |
| Type of inputs |  |  |  |  |
| Type of output |  |  |  |  |
| Number of inputs |  |  |  |  |
| Block Icon |  |  |  |  |

3. Determine the value of the output of the following programming blocks

**Question IV**

In a certain robot application, the programmer used the following configuration for the given block.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. The block shown is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. The block can be found in \_\_\_\_\_\_\_\_\_\_\_\_ group in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ palette. 3. The block is used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. Block application:  * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  1. The numbers 1, 2 &3in the figure indicate:  |  |  | | --- | --- | | Number1: |  | | Number2: |  | | Number3: |  | | 1  2  3 |
| 1. The block shown is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. The block can be found in \_\_\_\_\_\_\_\_\_\_\_\_ group in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ palette. 3. The block is used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. Block application:  * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  1. The numbers 1, 2 & 3 in the figure indicate:  |  |  | | --- | --- | | Number1: |  | | Number2: |  | | Number3: |  | | 1  2  3 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. The block shown is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. The block can be found in \_\_\_\_\_\_\_\_\_\_\_\_ group in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ palette. 3. The block is used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   1. Block application:  * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  1. The numbers 1, 2, 3, 4 &5 in the figure indicate:  |  |  | | --- | --- | | Number1: |  | | Number2: |  | | Number3: |  | | Number4: |  | | Number5: |  | | 1  2  3  5  4 |
| 1. The block shown is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. The block can be found in \_\_\_\_\_\_\_\_\_\_\_\_ group in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ palette. 3. The block is used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   1. Block application:  * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  1. The numbers 1, 2 &3 in the figure indicate:  |  |  | | --- | --- | | Number1: |  | | Number2: |  | | Number3: |  | | 1  2  3 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. The block shown is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. The block can be found in \_\_\_\_\_\_\_\_\_\_\_\_ group in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ palette. 3. The block is used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. The numbers 1 & 2 in the figure indicate:  |  |  | | --- | --- | | Number1: |  | | Number2: |  | | 1  2 |
| 1. The block shown is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. The block can be found in \_\_\_\_\_\_\_\_\_\_\_\_ group in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ palette. 3. The block is used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   1. Block application:  * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  1. The numbers 1, 2 &3 in the figure indicate:  |  |  | | --- | --- | | Number1: |  | | Number2: |  | | Number3: |  | | 1  2  3 |
| 1. The block shown is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. The block can be found in \_\_\_\_\_\_\_\_\_\_\_\_ group in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ palette. 3. The block is used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   1. Block application:  * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  1. The numbers 1, 2 &3 in the figure indicate:  |  |  | | --- | --- | | Number1: |  | | Number2: |  | | Number3: |  | | 1  2  3 |

**Question V**

|  |
| --- |
| **Part A:**  A steering value has a range between -100 and 100, how can you generate a random negative value to allow steering to take place, draw the configuration needed in the space provided |
|  |

**Part B:**

Write the configuration of the following blocks. Write your answers in the below tables:

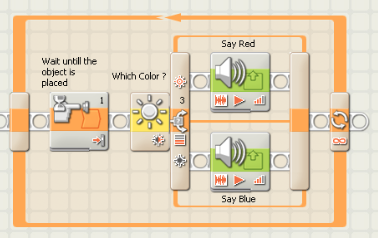
|  |  |  |
| --- | --- | --- |
|  |  |  |
| Variable name |  |  |
| Variable Type |  |  |
| Variable Action |  |  |

|  |
| --- |
| **Part C:**  Describe the sequence of the following NXT-G code. |
|  |
||

|  |
| --- |
| **Part D:**  Using the following program, answer the below questions: |
|  |
| * Suggest an application for the previous code   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * What is the programming block that is used to control the switch?   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * How many different programming blocks are in the previous program?   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * What is the use of the “Random” block in the previous configuration?   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * What is the use of the “Math” block in the previous configuration?   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Part E:**

The following code is used to determine the color of an object (Red orBlue). Update the following program to count and display the number ofred and blue objects. (Use the software to update the program)



Write your modified program here:

|  |
| --- |
|  |